



# Air Force Research Laboratory|AFRL

*Science and Technology for Tomorrow's Air and Space Force*

## **Success Story**

### **AFRL SOFTWARE AGENTS ADDRESS AMC NEEDS**



Generating an Air Mobility Command (AMC) flight schedule requires the collaborative efforts of many individuals, each with specific responsibility and authority. Individuals may control both required and requested tasks as well as resources needed to accomplish those tasks.

SRI, Inc. developed agents technology and will apply work on dynamic mediation (developed under the Defense Advanced Research Projects Agency Autonomous Negotiating Teams [ANTs] program) to AMC scheduling issues. Dynamic mediation is a real-time negotiation protocol that is adaptive and incremental. SRI will integrate this technology with a dynamic scheduler.



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## **Accomplishment**

The Information Directorate's Information Technology Division performed the technical management of the ANTs program. The directorate recently awarded SRI's effort as part of the Information Systems Division's Integrated Flight Management (IFM).

The transfer of ANTs technology to the IFM is reflective of the ongoing collaboration between the two projects. Ideally, the agents-based scheduling work will continue on the transition path to AMC via the same successful process used for both the worldwide aeronautical route planner and the intelligent distribution of notices to airmen.

## **Background**

SRI, Inc. will identify a set of representative scenarios from the AMC problem domain that requires automated support for collaboration among schedulers. SRI will develop methods to support collaboration, as proof of concept, using those scenarios as motivation.

For example, when AMC is resource-restrained, it may be useful to negotiate with the wings for more assets. The wings are scattered around the world. Consequently, the negotiations may occur during initial scheduling of the requirement or during schedule modification in response to events during execution.

The negotiation that occurs between the wings and AMC involves resolution of issues such as who should provide extra capacity or whether or not to drop missions. Factors that can influence those decisions include mission priority, the degree to which the wing is already over contact level, physical constraints at the wing (such as availability of the proper type of plane and distance from the mission destination), and the priority of other requirements on unused capacity at the wing.

Once such issues are settled, the barrell allocator assigns missions to wings, and the scheduler sends orders to wings. The wings can then assign the exact number of planes and crews. SRI will support collaboration in two dimensions: first, by providing automated support of the negotiation of resource conflicts, and second, by monitoring local state information for helpful actions that can further the scheduling activities of another user of the aggregate team activity.

## **Additional information**

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-IF-01)